

|            |   |          |
|------------|---|----------|
| $V_{RRM}$  | = | 400 V    |
| $I_{FAVM}$ | = | 11350 A  |
| $I_{FRMS}$ | = | 17800 A  |
| $I_{FSM}$  | = | 85000 A  |
| $V_{F0}$   | = | 0.74 V   |
| $r_F$      | = | 0.018 mΩ |

## Rectifier Diode

# 5SDD 0120C0400

Doc. No. 5SYA1159-01 Oct.00

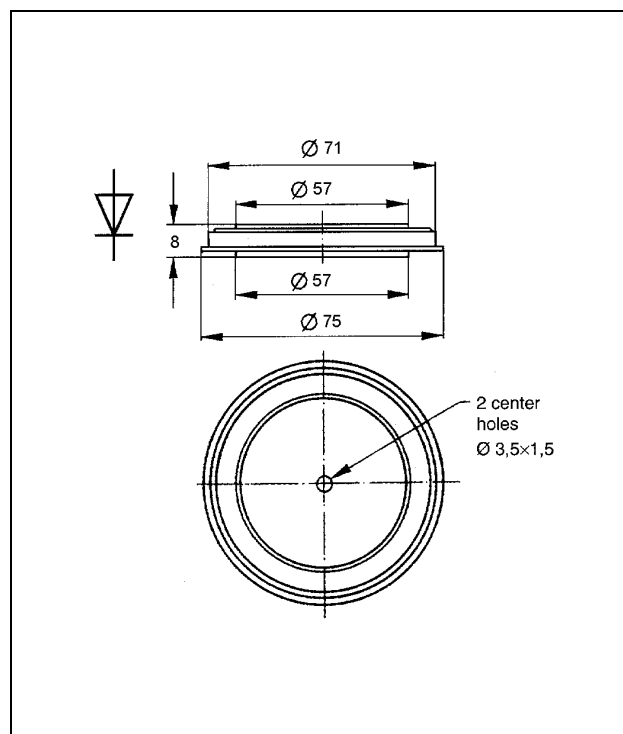
- Optimized for high current rectifiers
- Very low on-state voltage
- Very low thermal resistance

### Blocking

|           |                                 |              |                                                                              |
|-----------|---------------------------------|--------------|------------------------------------------------------------------------------|
| $V_{RRM}$ | Repetitive peak reverse voltage | 400 V        | Half sine wave, $t_p = 10$ ms, $f = 50$ Hz                                   |
| $V_{RSM}$ | Maximum peak reverse voltage    | 450 V        | Half sine wave, $t_p = 10$ ms                                                |
| $I_{RRM}$ | Repetitive peak reverse current | $\leq 50$ mA | $T_j = 170$ °C <span style="float: right;"><math>V_R = V_{RRM}</math></span> |

### Mechanical

|       |                                                     |      |                                             |
|-------|-----------------------------------------------------|------|---------------------------------------------|
| $F_M$ | Mounting force                                      | min. | 35 kN                                       |
|       |                                                     | max. | 40 kN                                       |
| a     | Acceleration:<br>Device unclamped<br>Device clamped |      | 50 m/s <sup>2</sup><br>200 m/s <sup>2</sup> |
|       |                                                     |      |                                             |
| m     | Weight                                              |      | 0.22 kg                                     |
| $D_S$ | Surface creepage distance                           |      | 4 mm                                        |
| $D_a$ | Air strike distance                                 |      | 4 mm                                        |



**Fig. 1**

Outline drawing.

All dimensions are in millimeters and represent nominal values unless stated otherwise.

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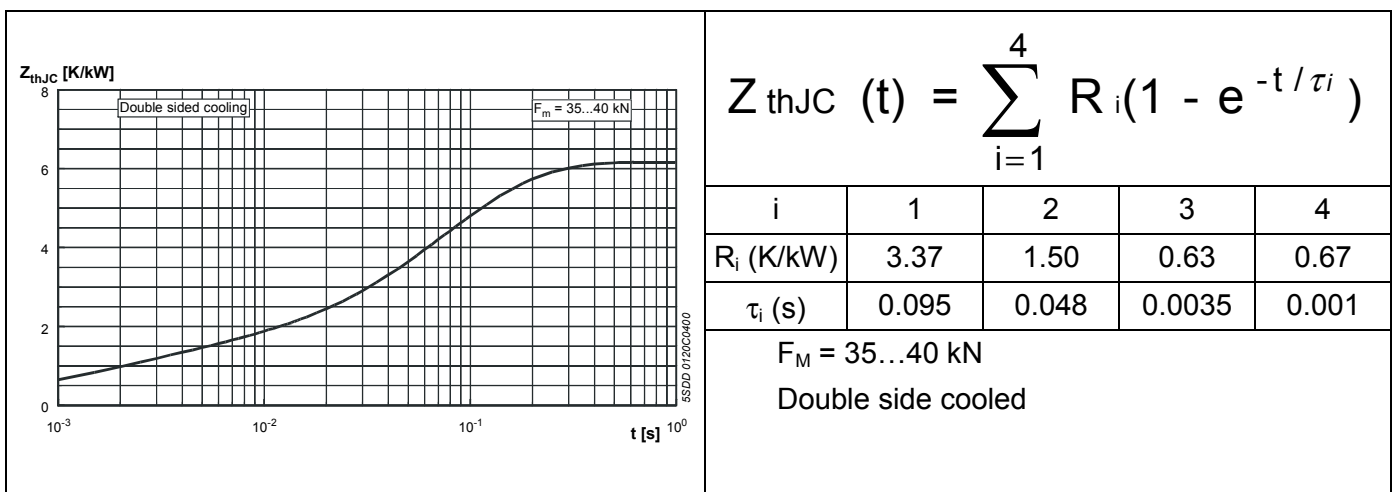
# ABB

### On-state

|                    |                                        |                             |                                      |                                         |
|--------------------|----------------------------------------|-----------------------------|--------------------------------------|-----------------------------------------|
| $I_{FAVM}$         | Max. average on-state current          | 11350 A                     | Half sine wave, $T_c = 85\text{ °C}$ |                                         |
| $I_{FRMS}$         | Max. RMS on-state current              | 17800 A                     |                                      |                                         |
| $I_{FSM}$          | Max. peak non-repetitive surge current | 85000 A                     | $t_p = 10\text{ ms}$                 | Before surge<br>$T_j = 170\text{ °C}$   |
|                    |                                        | 92500 A                     | $t_p = 8.3\text{ ms}$                |                                         |
| $\int i^2 dt$      | Max. surge current integral            | 36100 $\text{kA}^2\text{s}$ | $t_p = 10\text{ ms}$                 | After surge:<br>$V_R \approx 0\text{V}$ |
|                    |                                        | 35700 $\text{kA}^2\text{s}$ | $t_p = 8.3\text{ ms}$                |                                         |
| $V_{F\text{ min}}$ | Minimum on-state voltage               | $\geq 0.83\text{ V}$        | $I_F = 8000\text{ A}$                | $T_j = 170\text{ °C}$                   |
| $V_{F\text{ max}}$ | Maximum on-state voltage               | $\leq 0.88\text{ V}$        |                                      |                                         |
| $V_{F0}$           | Threshold voltage                      | 0.74 V                      | Approximation for                    | $T_j = 170\text{ °C}$                   |
| $r_F$              | Slope resistance                       | 0.018 $\text{m}\Omega$      | $I_F = 8 - 18\text{ kA}$             |                                         |

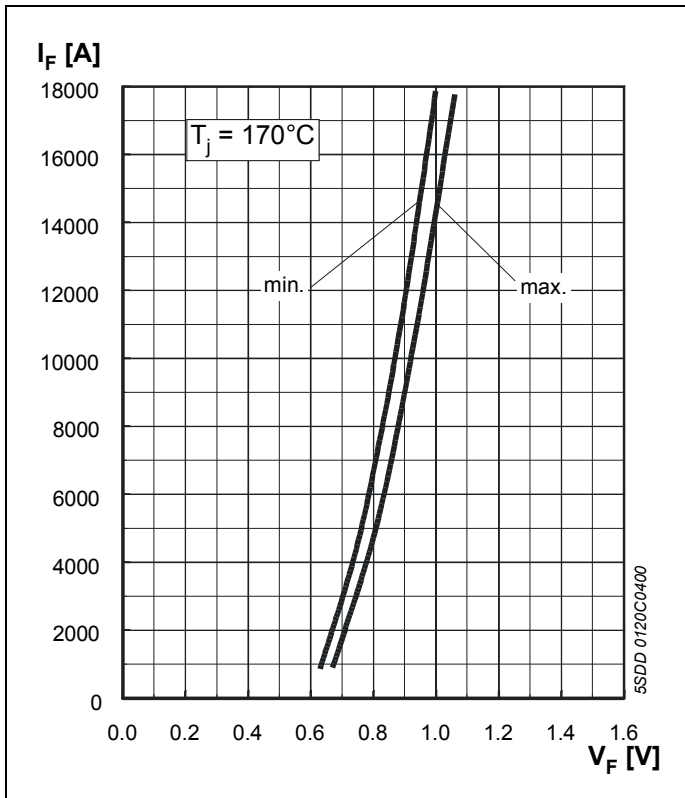
### Thermal characteristics

|            |                                      |                       |                     |                           |
|------------|--------------------------------------|-----------------------|---------------------|---------------------------|
| $T_j$      | Operating junction temperature range | -40...170 °C          |                     |                           |
| $T_{stg}$  | Storage temperature range            | -40...170 °C          |                     |                           |
| $R_{thJC}$ | Thermal resistance junction to case  | $\leq 12\text{ K/kW}$ | Anode side cooled   | $F_M = 35...40\text{ kN}$ |
|            |                                      | $\leq 12\text{ K/kW}$ | Cathode side cooled |                           |
|            |                                      | $\leq 6\text{ K/kW}$  | Double side cooled  |                           |
| $R_{thCH}$ | Thermal resistance case to heatsink  | $\leq 6\text{ K/kW}$  | Single side cooled  |                           |
|            |                                      | $\leq 3\text{ K/kW}$  | Double side cooled  |                           |



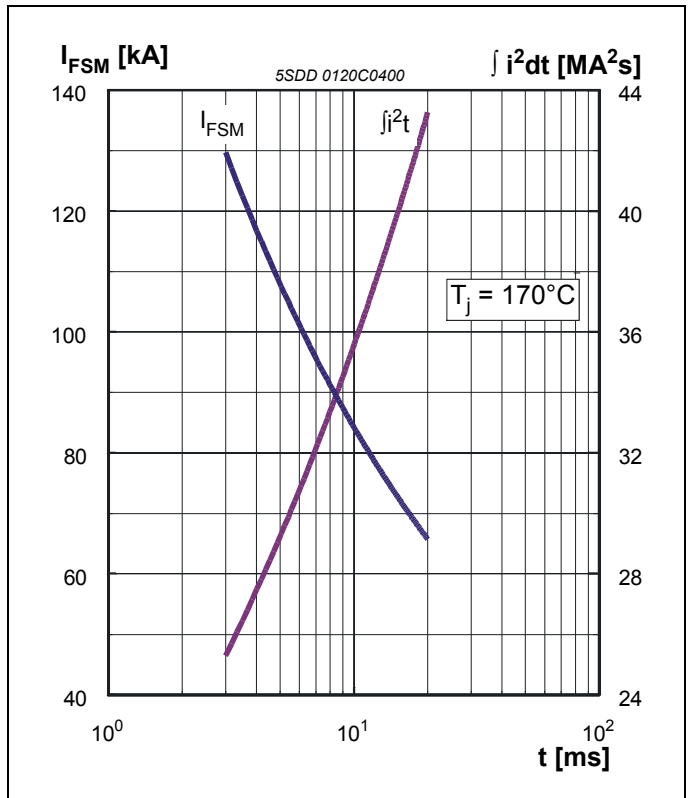
**Fig. 2** Transient thermal impedance (junction-to-case) vs. time in analytical and graphical forms.

### On-state characteristics



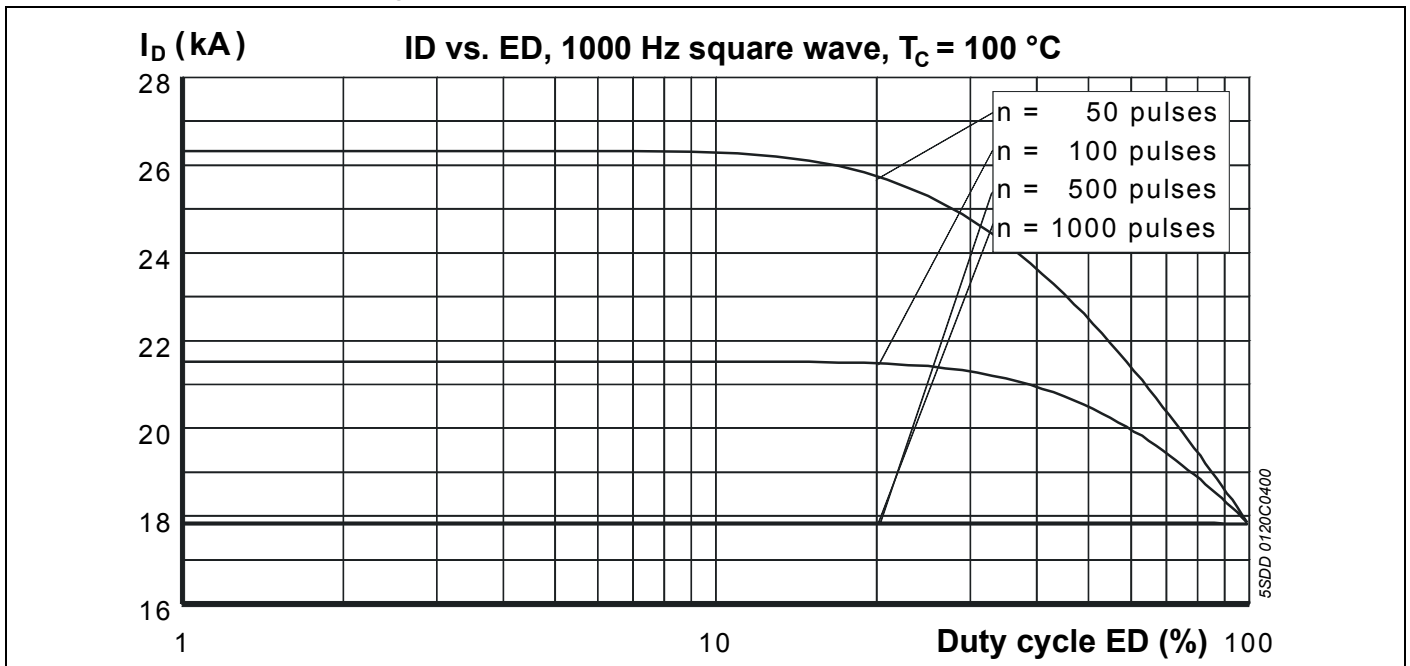
**Fig. 3** Forward current vs. forward voltage (min. and max. values).

### Surge current characteristics



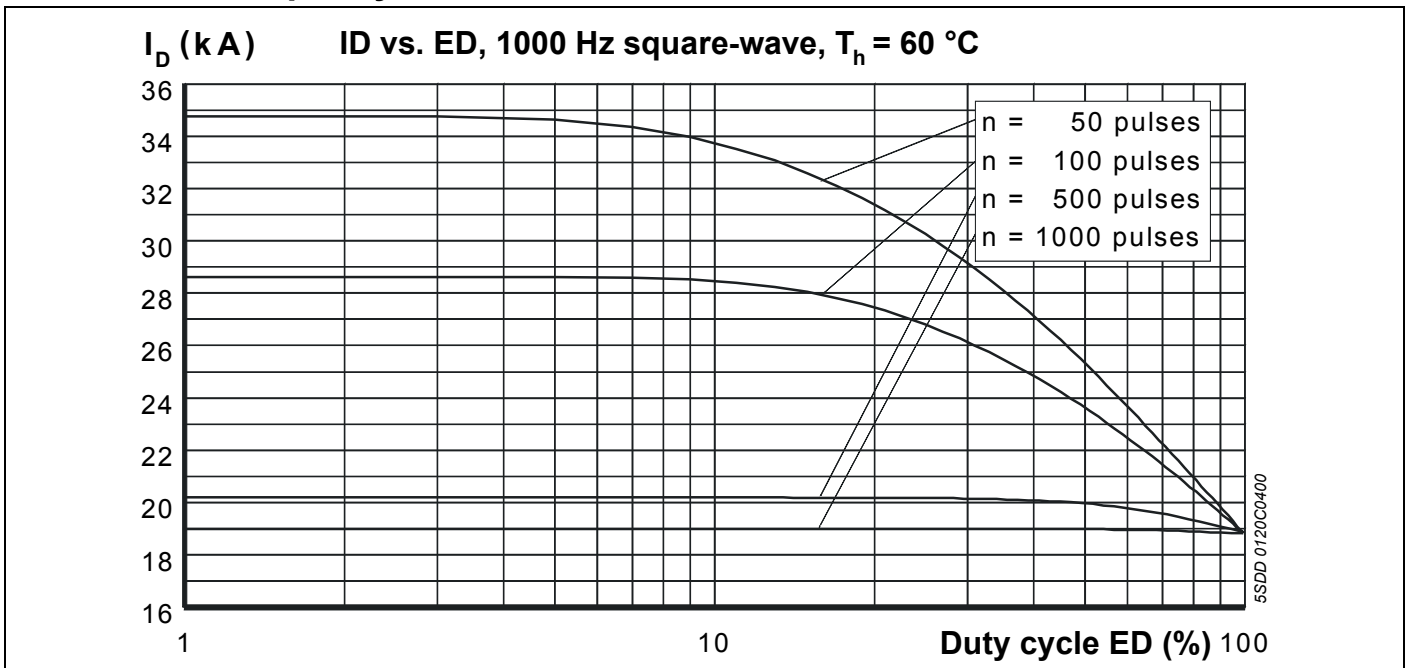
**Fig. 4** Surge current and fusing integral vs. pulse width (max. values) for non-repetitive, half-sinusoidal surge current pulses.

### Current load capability

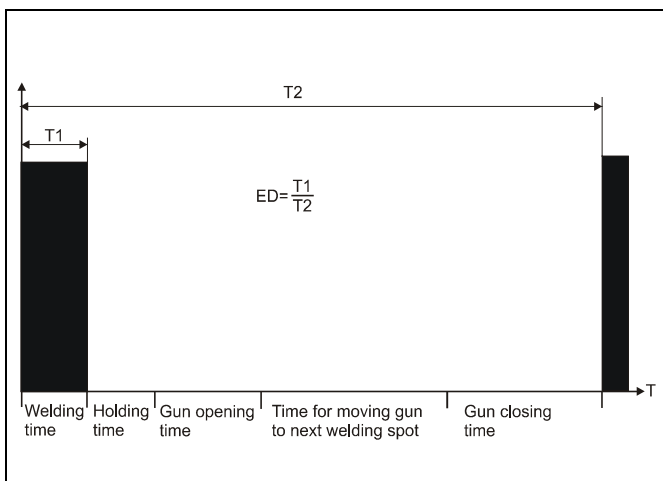


**Fig. 5** DC-output current with single-phase centre tap

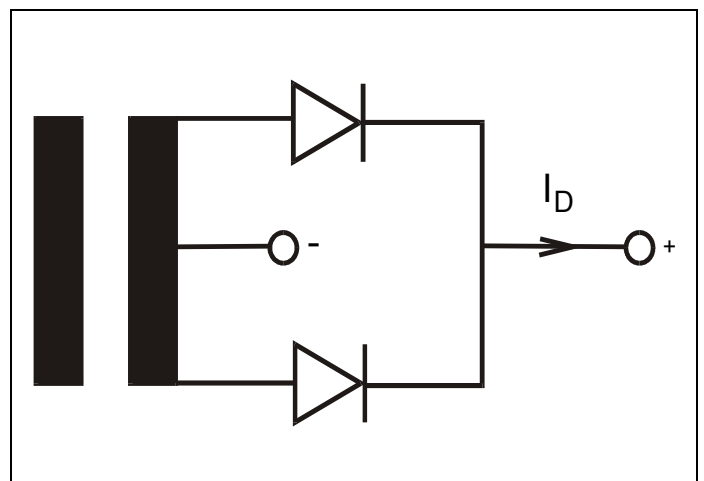
**Current load capacity, cont.**



**Fig. 6** DC-output current with single-phase centre tap



**Fig. 7** Definition of ED for typical welding sequence



**Fig. 8** Definition of ID for single-phase centre tap

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